



Humanized antibodies  
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Figure 1

**Figure 1.**

Amino acid sequence of murine 1A6 antibody (SEQ ID NO: 37, 38, 41 and 42) and human consensus sequence of heavy chain subgroup III (HumIII) (SEQ ID NO: 39, SEQ ID NO: 45); and light chain kappa subgroup I (Hum kI) (SEQ ID NOS: 40, and 46).

**V<sub>H</sub> Domain**

|          | 1                       | 11                  | 21          | 31                | 41                |    |
|----------|-------------------------|---------------------|-------------|-------------------|-------------------|----|
| Mouse1A6 | EVQLQQSGAE              | LVKPGASVKL          | SCTASGFNIK  | <b>DTYIHWMKQR</b> | PEQGLEW I GR      |    |
|          | ** * *                  | * * **              | *           | *                 | * * * * *         | ** |
| HumIII   | EVQLVESGGG              | LVQPGGSLRL          | SCAASGFNFS  | -----             | WVRQA PGKGLEWVA-- |    |
|          |                         |                     |             |                   |                   |    |
| Mouse1A6 | 51 a                    | 61                  | 71          | 81 a bc           | 91                |    |
|          | <b>IDPANDNTIYD</b>      | <b>PKVQGKATMT</b>   | ADTSS NTAYL | QLSSLTSEDTAVY     | YCTT              |    |
|          | ** * * * *              | *                   | *           | *                 | **                | *  |
| HumIII   | -----                   | <b>A DSVKGRFTIS</b> | RDDSKNTAYL  | QMNSLRAEDTAVY     | YCTR              |    |
|          |                         |                     |             |                   |                   |    |
| Mouse1A6 | 103                     | 111                 |             |                   |                   |    |
|          | <b>SGYWFA YWGQGTLVT</b> | VSA                 |             |                   |                   |    |
|          | *                       |                     |             |                   |                   |    |
| HumIII   | -----                   | <b>--WGQGTLVT</b>   | VSS         |                   |                   |    |

**V<sub>L</sub> Domain**

|          | 1                           | 11                | 21                | 31                | 41               | 51                 |
|----------|-----------------------------|-------------------|-------------------|-------------------|------------------|--------------------|
| Mouse1A6 | DIVLTQSPAT                  | LSVTPGDSVS        | LSCRASQSIS        | NNLHWYQQKS        | HESPRLLIKH       | ASQ                |
|          | ** * * * *                  | *** * ***         |                   |                   | * *** * *        |                    |
| HumkI    | DIQMTQSPSS                  | LSASVGDRVT        | ITC-----          | -----             | WYQQKP GKAPKLLIY | -- -----           |
|          |                             |                   |                   |                   |                  |                    |
| Mouse1A6 | 61                          | 71                | 81                | 91                | 101              |                    |
|          | <b>SISG I PS RFSGSGSGTD</b> | <b>FTLSINSVET</b> | <b>EDFGMFFCQQ</b> | <b>SNSWPYTFGG</b> | <b>GTKLEIKR</b>  |                    |
|          | *                           | ***               | ***               | ***               | *                | *                  |
| HumkI    | ---GVPS                     | RFSGSGSGTD        | FTLTISLQP         | EDFATYYC          | ---              | ----- FGQ GTKVEIKR |

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Figure 3

**Figure 3**

Amino acid sequence of murine 1A6 antibody (SEQ ID NOS: 37 and 38), humanized 1A6 (HumB) (SEQ ID NOS: 43 and 44), and human consensus sequences of heavy chain subgroup III (HumIII) (SEQ ID NOS: 39 and 45) and light chain kappa subgroup I (HumKI) (SEQ ID NOS: 40, and 46).

**V<sub>H</sub> Domain**

|        | 1   | 11  | 21                 | 31             | 41             |     |
|--------|---|---|--------------------|----------------|----------------|-----|
| Mouse  | EVQLQQSGAE  | LVKPGASVKL  | SCTASGFNI <b>K</b> | DTYIHWMKQR     | PEQGLEWI GR    |     |
|        | ***   | ***   | *                  | *              | ***            | *** |
| HumB   | EVQLVESGGG  | LVQP <span style="font-variant: small-caps;">gg</span> SLRL   | SCAASGFNI <b>K</b> | DTYIHWVRQA     | PGKGLEWVAR     |     |
| HumIII | EVQLVESGGG  | LVQP <span style="font-variant: small-caps;">gg</span> SLRL   | SCAASGFNFS         | -----WVRQA     | PGKGLEWVA----- |     |
|        |   |   |                    |                |                |     |
|        | 51 a  | 61  | 71                 | 81 a bc        | 91             |     |
| Mouse  | IDPANDNTI <b>YD</b>   | PKVQ <span style="font-variant: small-caps;">gk</span> ATMT   | ADTSS NTAYL        | QL SSLTSEDTAVY | YCT T          |     |
|        | ***   | ***   | **                 | ***            | ***            | *   |
| HumB   | IDPANDNTI <b>YA</b>   | DSVK <span style="font-variant: small-caps;">g</span> RFT IS  | SDDSKNTAYL         | QMNSLRAEDTAVY  | YCTA           |     |
|        |   |   | *                  |                |                | *   |
| HumIII | -----A  | DSVK <span style="font-variant: small-caps;">g</span> RFT IS  | RDDSKNTAYL         | QMNSLRAEDTAVY  | YCTR           |     |
|        |   |   |                    |                |                |     |
|        | 103   | 111   |                    |                |                |     |
| Mouse  | SGYWFA  | YW <span style="font-variant: small-caps;">gqgtlvt</span> VSA |                    |                |                |     |
| HumB   | SGYWFA  | YW <span style="font-variant: small-caps;">gqgtlvt</span> VSS |                    |                |                |     |
| HumIII | -----W <span style="font-variant: small-caps;">gqgtlvt</span> | VSS   |                    |                |                |     |

**V<sub>L</sub> Domain**

|       | 1          | 11  | 21   | 31                 | 41              | 51       |          |
|-------|------------|---|--|--------------------|-----------------|----------|----------|
| Mouse | DIVLTQSPAT | LSVT <span style="font-variant: small-caps;">pgds</span> VS | LSCRASQSIS   | NNLHWYQQKSH        | ESPRLLIKH ASQ   |          |          |
|       | ***        | **  | ***  | *                  | ***             |          | ***      |
| HumB  | DIQMTQSPSS | LSASVGDRVT  | ITCRASQSIS   | NNLHWYQQKP         | GKAPKLIYH ASQ   |          |          |
| HumKI | DIQMTQSPSS | LSASVGDRVT  | ITC-----   | -----              | WYQQKP GKAPKLIY | --       | -----    |
|       |            |   |  |                    |                 |          |          |
|       | 61         | 71  | 81   | 91                 | 101             |          |          |
| Mouse | SISG I PS  | RFSGSGSGTD  | FTLSINSVET   | EDFGMFFC <b>QQ</b> | SNSWPYTFGG      | GTKLEIKR |          |
|       | *          |   |  | ***                | ***             | *        | *        |
| HumB  | SISGVPS    | RFSGSGSGTD  | FTLT <span style="font-variant: small-caps;">isslqp</span> | EDFATYYC <b>QQ</b> | SNSWPYTFGQ      | GTKVEIKR |          |
| HumKI | ---GVPS    | RFSGSGSGTD  | FTLT <span style="font-variant: small-caps;">isslqp</span> | EDFATYYC           | -----           | FGQ      | GTKVEIKR |

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Figure 4

**Figure 4. cDNA Sequences of Humanized scFv3 (HumI) [SEQ ID. 47].**

The restriction sites are underlined. CCATGG NCO I SITE; GGATCC BAMH I SITE;  
GTAAAC HPA I SITE

CGAACCCATGGGCGATATCCAGATGACCCAATCTCCGTCTAGCCTGAGC  
GCCAGTGTGGTATCGAGTTACCATTACTGCCGCCAGCCAATCTATCAG  
TAATAATCTTCACTGGTATCAACAAAAACCGGGTAAAGCTCCGAAACTTCTT  
ATCAAACACGCCTCTCAGAGCATTAGCGGCGTCCGAGCCGCTCTGGCTC  
TGGCTCGGGCACGGACTTACCCCTTACCATCAGCTCTTCAGCCGGAAGACT  
TTGCCACCTATTATTGTCAAGCAGTCTAATAGCTGCCGTACCTTCGGTCAA  
GGTACCAAGGTCGAGATTAAGCGCGCGTGGCGGTCTGGTGGCGGTGGTA  
GCGGTGGCGGTGGATCCGGTGGCAGCGAAGTTCAACTTGTGAGTC  
TGGTGGCGGTCTGGTCAGCCGGTGGCTCTGCGCCTGTCTGCGCAGCAA  
GCGGTTCAACATTAAGGACACCTACATCCATTGGATGAGGCAAGCTCCGGG  
TAAGGGTCTGGAGTGGGTGGCACGTATCGACCCGGAAACGACAACACCATT  
TACGATCCGAAGGTGCAGGCCGTTTACTATGTCTGCGGACACCTCTAAGA  
ACACCGCGTACCTCAGATGAACCTCTGCGTGCCTGAGGACACCGCCGTCTA  
CTACTGCACGACCTCTGGCTACTGGTTGCCTACTGGGGCCAGGGCACGCTTG  
TCACCGTCTCTGGTTAACCC

[0019] FIG. 4 shows the cDNA sequence of humanized scFV3 ( single chain HumI) antibody. Restriction sites are indicated by underlining.

Figure 5

